

Energy supply shortages or disruptions can ultimately affect every person and every economic sector in the state. The ability to anticipate supply shortages and respond appropriately to supply disruptions — such as the effect of thermal plant outages, wildfires, and market forces on the electric system this summer or the effect on the petroleum supply resulting from the Olympic Pipeline explosion in 1999 — can help mitigate the severity of emergencies. Natural disasters such as earthquake, fire, flood, severe winter or summer weather conditions, or geopolitical events such as war, terrorism, civil disturbance, or embargo can cause a shortage. In some unique circumstances, government response to high-energy prices is also warranted.

The Energy Division of the Office of Trade and Economic Development (OTED) lends expertise to utilities and other state agencies as needed to mitigate the effects of acute system failures and localized outages. By statute, the Energy Division is also responsible for administering contingency plans; coordinating a response to petroleum and electricity supply shortages; and administering the Governor's energy emergency powers.<sup>1</sup>

Safe and reliable supplies of energy underpin essential services such as heating, lighting, refrigeration, transportation, and communications. Energy emergencies — supply shortages or disruptions — can be extraordinarily devastating. They have economic consequences and they can threaten lives and property.

Electricity emergencies have the greatest potential for causing loss of life and affecting health and safety. Unlike oil and gas emergencies, where electricity can be substituted to provide heat, the loss of electricity shuts off all heating systems that require ignition or fans. Electricity emergencies also affect lighting, water and sewer processing and pumping services, food processing, refrigeration, communications,

Internet service, life support systems, security systems, banking and bankcard services, and gasoline pumping.

Prevention provides the first line of defense. Energy distribution companies design strong and redundant systems to guard against failures. But failures will occur, and contingency plans are needed to address a full range of emergency situations — from localized outages to region-wide disasters. Energy suppliers handle most emergencies, with the state providing assistance as needed. In more severe emergencies, the state plays a larger role.

## Types of Emergencies

Washington's energy systems are vulnerable to two types of emergencies: *acute system failures*, usually caused by accidents or severe weather, and *supply shortages*.

### Acute System Failures

All energy delivery systems are vulnerable to accidents and disasters. However, petroleum and natural gas disruptions are quite rare and tend to have economic rather than life-threatening consequences. Electricity system failures are more common and more serious. There has been growing concern that power outages may become more common as electricity restructuring increases the number of energy suppliers using the grid to transmit power, and as utilities attempt to cut costs in the new competitive environment by limiting investments in maintenance and upgrades.

With increasing reliance on natural gas-fired electricity generation, there may be more potential for combined natural gas/electricity emergencies. During very cold weather there could be strong demand for natural gas for both heating and electricity generation. For example, during a cold snap in November 2000, three large southern California power generators had to switch to fuel oil as San

Diego Gas & Electric curtailed natural gas deliveries in order to be able to provide sufficient gas to residential and commercial customers. San Diego Gas and Electric delivered more gas on November 13, 2000 than on any other day on record, beating peaks set in January 1999. Clearly, as demand increases, the infrastructure will have to expand<sup>2</sup>.

Acute electric system failures usually result from storms or accidents that damage facilities and equipment. When this happens, the supply of energy cannot reach users until the damage has been repaired and service restored.

During the summer of 2000, the Western Interconnection faced a number of challenges to system operations based on structural fires and wildfires. On July 28, a fire broke out in one of the powerhouses of Grand Coulee Dam, bringing down one third of the largest hydroelectric facility in the region. Nine out of 16 generators were back on line by July 30 and following investigations and repair, full capacity was restored by early August. Another fire that broke out in the Columbia Generating Station, the only operating nuclear facility in the region, caused safety and power supply concerns. Heavy smoke from Montana wildfires caused arcing on the large transmission lines delivering electricity to the Northwest from power plants in Colstrip. Although the plants were operational, transmission of the power was not possible until the smoke subsided and the transformers could be repaired.

The petroleum industry has also dealt with system failures resulting from accidents. In 1999, the Olympic Pipeline explosion in Bellingham and the resulting closure of the pipeline between Bellingham and Anacortes required extensive efforts on the part of the refineries in order to get petroleum products to end users. Response included exchange agreements with refineries in Anacortes for space on the southern portion of the pipeline that is still in operation, and increased transportation of petroleum products by truck and barge. SeaTac airport presented a particular challenge since it can ONLY be supplied by pipeline. SeaTac has no marine

access for petroleum barges and the huge volume of fuel required cannot be met by trucking product. Cherry Point and Ferndale refineries ended up barging fuel to Anacortes where it was then transferred to the pipeline for delivery to the airport. These measures will continue until the pipeline reopens, tentatively set for the summer of 2001.

### **Supply Shortages**

Longer-term energy supply shortages can result from accidents or disasters. Localized shortages can also develop, however, if customers or distributors engage in panic buying because they anticipate higher prices or future supply shortages. This exceptional demand can outstrip the distribution system's ability to respond.

More extensive energy shortages normally result from a broader set of causes. For example, war in the Persian Gulf could create a severe worldwide shortage of oil. Drought in the Northwest could set the stage for insufficient winter supplies of electricity. Because shortages have different causes and effects than acute system failures, they require a different response. Demand needs to be restrained to meet available supply until supply can be increased. Repairing facilities usually does not factor into the response.

Unlike most acute system failures, addressing significant energy shortages requires substantial state involvement. Efforts center on getting the public to respond by reducing energy consumption. State leadership in raising public awareness and educating consumers is critical.

Allocating scarce energy supplies to ensure that essential service providers have fuel may also be required. Because allocation can be quite contentious, state leadership is required to ensure effective and equitable distribution. In the case of extreme shortages, some rather demanding steps may have to be taken — such as waiving environmental restrictions on certain types of energy production. This can only be done under the guidance and authority of the Governor's emergency powers.

## Response for Petroleum Shortages

The major impact of most petroleum shortages is economic: prices rise to reflect limited supplies. Steep or rapid rises in price can cause a variety of economic problems. These problems adversely affect people with low or fixed incomes. Businesses that depend heavily on transportation may be threatened by increased cost of doing business. Furthermore, if a shortage is very extreme, pricing alone cannot guarantee sufficient fuel to essential service providers.

In such an event, Energy Division staff would prepare the state for the possibility of a major oil shortage. Efforts would concentrate on public education and the preparedness of state agencies, local governments, essential service providers, and transit agencies. Arrangements would be made with oil companies for responding to critical needs and administering fuel allocations in case such steps were necessary. During an emergency, the Energy Division would inform the public through the news media of the status of the emergency, the stage of emergency, and whether specific actions are recommended or mandated.

The Implementation Guide for the Petroleum Products Contingency Plan<sup>3</sup> calls for the Energy Division to undertake a phased array of increasingly stronger response actions corresponding to the severity of a crisis. The plan operates under the assumption that a combination of market forces (such as price changes) and government intervention (such as the dissemination of information about an emergency) work together to reduce petroleum consumption and allocate scarce supplies. The plan relies more heavily on market forces early in a crisis. The Energy Division plays a central role coordinating state-level decision making and emergency information communication. However, most actions that will help the state weather a petroleum emergency must be taken by individual agencies, businesses, and citizens.

As of the publishing of this report, the state's existing Petroleum Products Contingency Plan is being updated. Energy Division staff will also review and revise the administrative rule

for dealing with petroleum emergencies to reflect changes in the industry, in federal regulations, and in policies for addressing petroleum shortages.

## Response for Regional Electricity Shortages

One type of electricity shortage is the inability to meet daily peak demand. The Northwest's vast hydroelectric system historically has provided a peaking capacity far beyond Washington's daily needs. However, some areas of the state, notably the Puget Sound region, are beginning to experience occasional difficulty meeting daily peak demand. This emerging problem results from a combination of transmission constraints and bottlenecks and lack of sufficient local generation, and is being addressed by the utility industry.

Electricity systems also have seasonal peaks. California and the Southwest experience peaking in the summer because of their large air conditioning load. The Northwest exports surplus power to California and the Southwest during the summer months. Washington's peak comes in the winter when demand for heating increases. Utilities can foresee a shortage by monitoring reservoir levels and weather. As fall and winter progress, utilities can work to avert such a shortage by increasing the operation of thermal and nuclear generation and purchasing more energy from out of state, including California and the Southwest. The result can be higher energy costs, but no winter shortage. Years of both drought and extreme cold weather are those where such a shortage is most likely.

During the next several years, however, there is an increasing possibility of power supply problems, even taking into account both regional resources and the availability of imports. According to a Northwest Power Planning Council (NWPPC) report, Western Interconnection peak loads have increased by nearly 12,000 megawatts while generating capacity only increased by 4,600 megawatts between 1995 and 1999.<sup>4</sup> The peak load increase would have been even greater if 1999-2000 had not been a relatively mild

weather year. This year, weather forecasters are predicting more normal cooler seasonal temperatures, meaning that electricity demand is likely to be higher.

### **Pacific Northwest Winter 2000-01 Energy Emergency Plan**

Because of the risk of possible electricity shortages, electricity emergency response procedures need to be in place. This effort includes an inventory of the actions that could be taken to cut back on electricity demand if needed, the trigger points for taking these actions, clear definitions of roles and responsibilities, and a communications plan to inform the public. A task force comprised of the Pacific Northwest Utilities Conference Committee, the Northwest Power Pool (NWPP), the Bonneville Power Administration, the NWPPC, and the Northwest states and utilities has developed a joint Proposed Pacific Northwest Winter 2000-01 Energy Emergency Plan. The draft plan is designed to help ensure that energy shortages don't translate into blackouts. The plan:

1. Institutes a warning system that will give energy operations personnel notice of impending problems and thus provide lead time to take steps to avert an emergency. Warnings will identify the intensity of a potential emergency--level one through three--with three being the most serious.
2. Ensures actions are consistent with Federal Energy Regulatory Commission standards of conduct and North American Electric Reliability Council criteria.
3. Sets up an Emergency Response Team (ERT) to facilitate a coordinated regional approach to a potential emergency. This team would evaluate the status of the system and determine if a warning should be issued or terminated.
4. Sets up a communications system to give accurate and timely information to system operations personnel, policymakers, and the public.
5. Establishes objective criteria for determining what constitutes an approaching emergency based on an analysis of electricity loads and resources.

6. Reinforces that certain steps such as relaxing air quality standards or fish mitigation measures would be taken only after other actions have been exhausted.
7. Provides a safe and confidential repository that allows utilities to pool market-sensitive information without fear that individual information about needs or resources would be compromised. This will give a fuller and more accurate picture of the region's overall electricity loads and resources.

The plan will complement, not replace, state, federal, and individual utility emergency plans.<sup>5</sup>

Although the Winter Energy Emergency Plan was still in draft stage and there were plans to exercise the plan to ensure that participants were familiar with the procedures, a serious cold front initially forecast during the first week in December, 2000 initiated "on the job" training on the energy emergency plan for the ERT of Northwest utilities and government representatives. The arctic front was forecast to move in over the weekend of December 9 and 10 and hit hardest December 11 through 14. Temperatures were predicted to be 17 to 19 degrees below normal on the westside of the state, and 17 to 23 degrees below normal on the eastside.

The NWPP gathered and analyzed weather, transmission, generation, and load information and quickly decided to convene the ERT for a briefing on December 6. Members of the team agreed that even though energy supplies were tight, at this point the region's transmission system and generation plants were in good shape. By consensus, the ERT stopped short of calling a "Regional Emergency Warning of a Potential Energy Alert" at that time. The team agreed to monitor the situation closely because any unplanned outages or further temperature drops could cause major problems. The ERT was scheduled to meet again by conference call on Friday morning, December 8, to reassess the situation.

Meanwhile, regional utilities and federal operating agencies began taking steps to prepare for the cold snap, such as deferring

planned maintenance outages of transmission and power plants, working to maximize generation output and energy imports, reducing demand for electricity, and adopting a "no touch" policy - basically making no alterations to facilities that could trigger outages.

California, which normally supplies power to the Northwest in the winter is currently having serious problems of its own and is not expected to be able to offer assistance to the Northwest to any major extent. Energy supplies will continue to be very tight throughout the west this winter.

On December 7, the governors of California, Idaho, Oregon, Utah, Washington, and Wyoming held a conference call to discuss the electricity crisis that could occur in a few days if the temperature got as cold as predicted. The Western Governor's Group met again on December 11, to exchange information, and although the immediate crisis seemed to be abating, they agreed to reconvene in the future for similar calls as appropriate.

During the conference call on December 8, the ERT group received an update on weather conditions and the approaching arctic front that was expected to be region-wide. In addition, the Northwest Security Coordinator provided an overall assessment of the load resource balance in the region. Based on the information provided, the Northwest utilities, federal hydro operation agencies, and state governments participating in the call agreed that the Northwest Security Coordinator should issue a "Regional Emergency Warning of Potential Alert 2." A warning, however, does not constitute an emergency. Rather, it is designed to give the Northwest energy community time to take steps to avert an emergency. The ERT scheduled another conference call for Sunday, December 10.

Utilities and government representatives shifted into high gear to get word out to residents, businesses, industry, and governmental entities to do whatever possible to reduce their use of electricity. The energy community called on the public to take steps to conserve energy, such as turning off unnecessary lighting and electrical equipment,

using energy-intensive appliances during non-peak hours, wrapping water heaters, weather stripping and caulking, and other measures that will make homes more energy efficient.

In addition, the governors of Oregon and Washington jointly called upon the residents and businesses in their states to begin conserving as much electricity and natural gas as possible in hopes of avoiding power disruptions when the cold weather arrived.<sup>6</sup>

Also occurring on December 8 was a conference call for all western state energy offices and electric and natural gas industry representatives to provide an overview of the situation for Federal Department of Energy officials.

On December 10, information presented convinced the ERT to maintain the Level 2 Warning, review the weather situation and electric system data and meet again by conference call on Monday, December 11. During the December 11 conference call, consensus again indicated that the Level 2 Warning should remain in place and be reassessed on Tuesday, December 12.<sup>7</sup>

At its December 12 meeting, the regional ERT terminated the Level 2 Warning.<sup>8</sup> The ERT did not drop down to a Level 1, but recalled the warning status altogether, based on a combination of factors:

- Public, state and utility actions to avert an emergency were working.
- Temperatures, while still below normal, were less extreme than predicted.<sup>9</sup>
- Forecasts indicated a shorter arctic front. By December 17, temperatures were expected to be just slightly below or near normal.

The region's utility community and states will continue to monitor the region's balance of power for resources and demand throughout the winter. The NWPP is compiling data on an ongoing basis. While conditions seemed to be returning to normal in mid-December, a new cold front or the loss of a regional generation or transmission resource could bring about new warnings. Power supplies throughout the West remain stretched. Winter

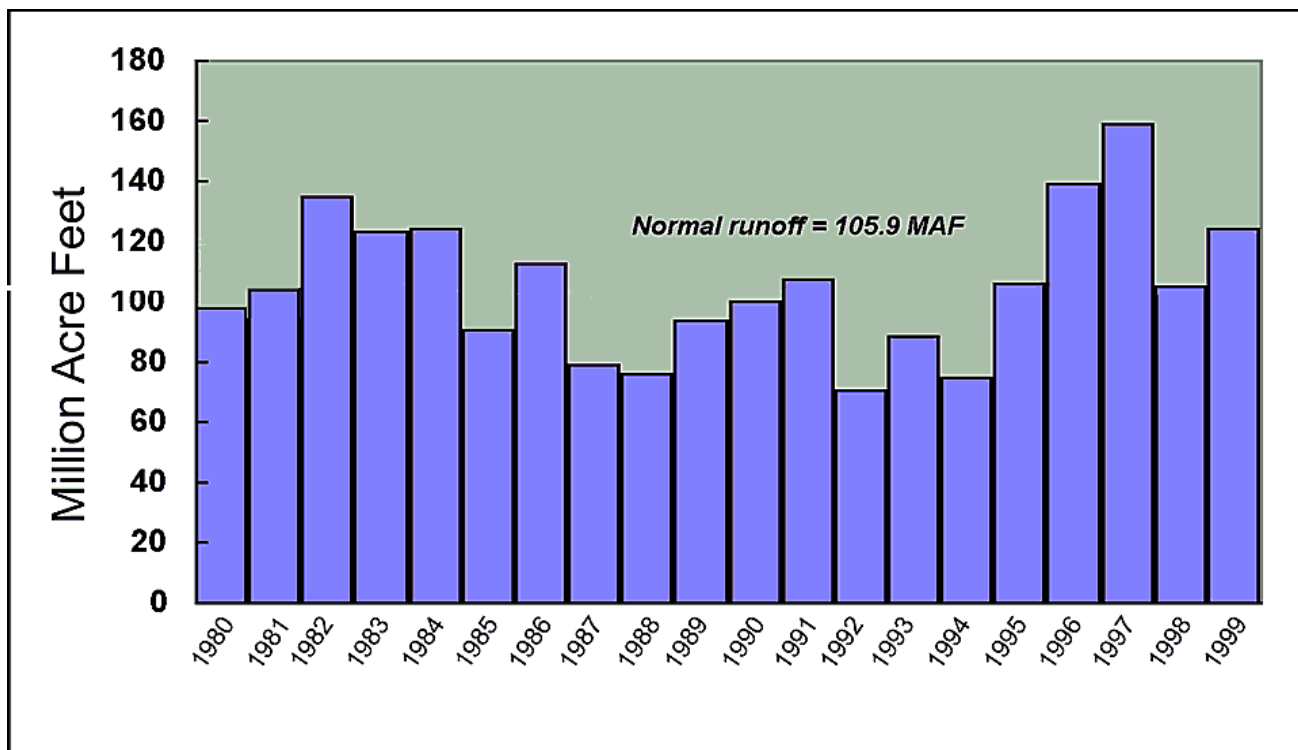
has not yet officially begun. Precipitation has been far below normal. If conditions change, the ERT will reconvene immediately.

The newly created energy alert warning system was designed to give the region time to take pre-emptive actions on a voluntary basis to avoid an emergency, and it appears to have been successful in its first test. The plan will be evaluated and revised based on lessons learned during its first trial.

"The response was an unprecedented level of regional cooperation and coordination among the region's states and the energy community," Rich Nassief, Director of the NWPP, said. "There are still bumps to be ironed out, but it's obvious we needed an emergency preparedness plan and it worked."

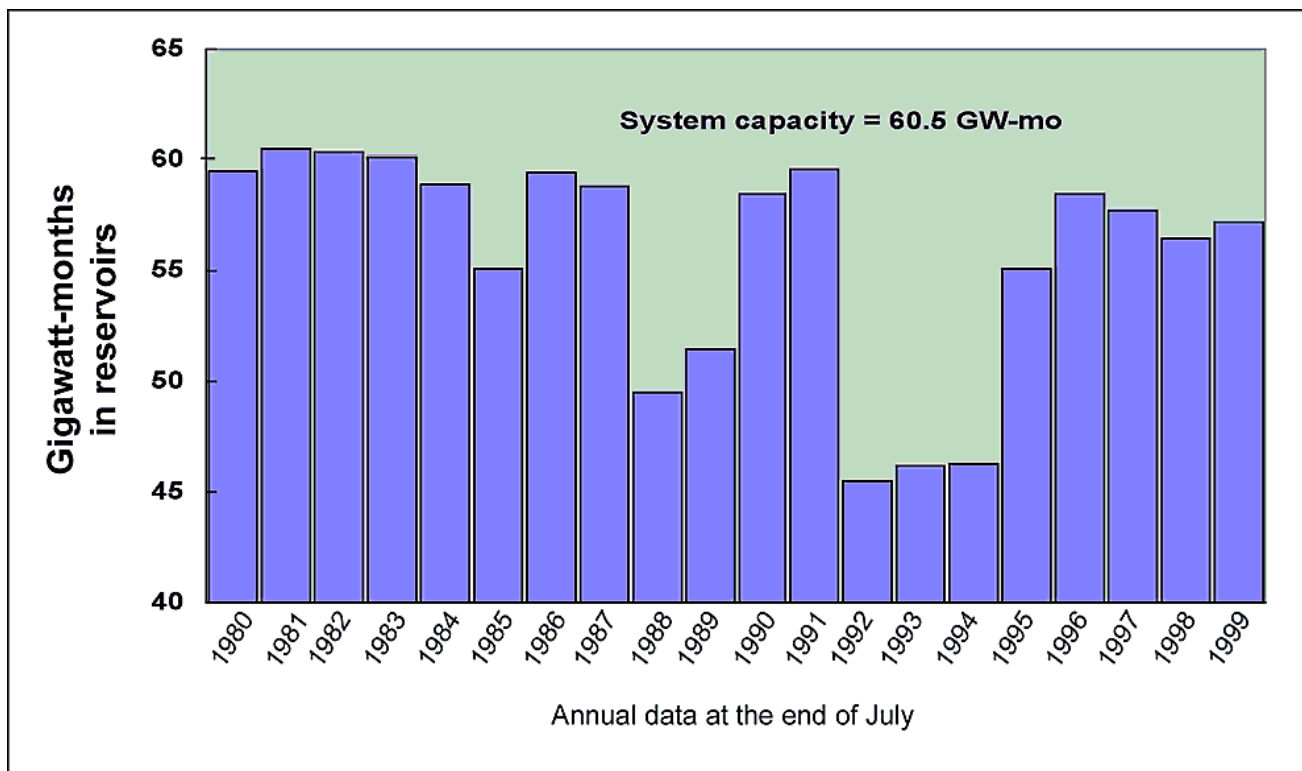
## State and Regional Curtailment Plans for Electric Energy

The Northwest's dependence on hydroelectricity also makes us particularly vulnerable to drought (see Figures 16 and 17). Drought conditions over an extended period of time could also cause a regional electricity shortage. The provinces and states of the NWPP (Washington, Oregon, Idaho, Wyoming, Nevada, Utah, Montana, British Columbia, and Alberta), coordinate operation of the hydroelectric system to maximize its efficiency and potential.



**Figure 16 January - July Runoff Colombia River at the Dalles**

Source: Energy News Data, Clearing Up, Issue No. 952, 10/23/00



**Figure 17 Below Normal Water Storage a Result of Recent Droughts**

Source: Energy News Data, Clearing Up, Issue No. 952, 10/23/00

In addition, a single, large transmission grid interconnects the entire Western United States. Within the grid, electrons do not recognize state borders. If there ever is insufficient energy to meet load on the grid, all Western states could be affected by the shortage. Recognizing the regional nature of electricity supplies, the four Northwestern states have adopted a regional approach for managing a shortage.

The Northwest's electric utilities, public utility commissions, and state energy offices worked together to update the Regional Curtailment Plan for Electric Energy. The four states used the regional plan as a model and adopted similar state plans. In November 1994, the Washington State Curtailment Plan for Electric Energy was adopted as administrative rule (WAC 194-22).

The plan calls for the four Northwest states to initiate curtailment actions jointly. Washington's plan emphasizes voluntary curtailment and equal curtailment requirements for residential, commercial, and

industrial customers. The plan has five stages; each level represents a more severe shortage that requires sterner steps. The first two stages are voluntary. The final three stages are mandatory. Consuming sectors are treated equally until stage four, where greater requirements to reduce consumption are placed on commercial and industrial customers. State law requires that such emergencies be implemented by the Energy Division under the guidance and direction of the Governor's Office.

The Washington State Curtailment Plan for Electric Energy establishes the process by which the state of Washington and Washington State utilities will initiate and implement statewide electric load curtailment when there is an insufficient supply of electric energy. The Energy Division would activate the plan during regional electricity situations where curtailment is necessary.

## The Governor's Energy Emergency Powers

Under the most severe emergencies, an emergency legislative committee is convened and the Governor's emergency powers are activated (RCW 45.21G, see Appendix B). Energy emergencies are recognized as having the potential to cause extreme risk to life, health and welfare, and to require quick and unusual action. For this reason, the governor is required to take the lead in addressing an emergency and is provided extraordinary powers. The legislature advises the governor, state agencies implement the governor's response programs, and citizens and businesses are required to obey, on penalty of a gross misdemeanor.

The governor's key emergency powers include:

- authority to declare an energy alert and emergency;
- authority to suspend or modify rules (administrative code);
- authority to suspend or modify standards (such as air quality standards);
- authority to order local governments to implement response programs;
- authority to implement programs, controls, and standards in the production, allocation and consumption of energy resources; and
- authority to establish and implement regional programs.

In developing plans to address an energy emergency, the governor is to give high priority to supplying "vital public services" and, to the extent possible, to encourage and rely on voluntary programs.

The governor is required to state explicitly in the declaration what powers are needed. In addition, extensive and precise language establishes how long emergency powers will exist. Extensions usually require legislative approval.

In August 2000, Governor Locke declared a statewide energy alert and took steps to ensure power for cold storage facilities critical to Washington's fishing and agricultural industries. Bellingham Cold Storage (BCS) provides 40% of the cold storage capacity in western Washington and handles more than a billion pounds of fruits, vegetables, and seafood annually. As a result of a unique set of institutional and regulatory circumstances, BCS found itself exposed to extreme price spikes in the electric market and had curtailed operations, laying off nearly 25% of their workers. As part of the energy alert declaration, the Governor directed the air pollution control authority in Spokane to allow continuous operation of a combustion turbine in Spokane County to provide reasonably priced electricity to BCS. This action allowed BCS to reopen and receive raspberries, cranberries, ocean fish, and other products during the critical summer and fall harvests.<sup>10</sup>

## Washington State Energy Emergency Response Plan

Although Washington State has had an electricity curtailment plan and a petroleum contingency plan for many years, the state has had no overall plan on how the state should respond to energy emergencies in general. Energy Division staff is currently drafting a Washington State Energy Emergency Response Plan.

Since each energy shortage is unique, it is impossible to envision every event or combination of events which might qualify as, or lead to, an energy emergency. Instead of developing a separate response plan for every type of shortage, the goal is to develop one flexible plan that would work in any emergency. The Response Plan will provide a management structure which identifies the working relationships among people and a process to make those relationships work in a crisis. The plan will represent a planning process with the flexibility both to evaluate and define a potential emergency, and to respond adequately to any shortage situation.



The Response Plan will rely on a mixed strategy response to an energy shortage. The plan will use a market-based approach with government intervention only to the extent necessary to protect the interests of public health, safety and welfare.

Section I of the Response Plan will provide a description of the phases, coordination with other levels of government, management structure, and mitigation and conservation programs. This section will also indicate the legal authority for the Energy Division to develop and implement an electricity curtailment plan or a petroleum contingency plan.

Section II will describe the plan operations, including the management structure, the organization chart, and operating guidelines or checklists for each person involved in plan implementation.

Section III will contain the office operations of the Energy Division staff under direction of the Energy Division Assistant Director. This section will guide the staff in the areas of data collection and analysis, preparation of reports, implementation of both voluntary and mandatory mitigation and conservation programs, and coordination in economic assistance.

## Summary

During the early stages of a shortage, the primary role of state government is monitoring and information exchange, rather than direct intervention in industry efforts to restore services and satisfy customer requirements. The Energy Division serves as a central source of credible and timely information on how a shortage impacts the state as a whole. The goal is to lessen the potential adverse impacts of a shortage by providing the Governor, Legislature, and policy makers, including those at the Military Department's Emergency Management Division, with accurate and timely information for decision making. If the shortage impacts transcend the boundaries of a single service territory or region, or if a shortage is likely to cause public controversy or attract

widespread media attention, the Energy Division then intensifies its monitoring and public information activities. If a shortage continues or worsens, the Energy Division will implement voluntary or mandatory conservation and other mitigation programs as appropriate.

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<sup>1</sup> RCW 43.21F State Energy Office Appendix A.

<sup>2</sup> Energy News Data, Western Price Survey, California Energy Markets, November 15, 2000

<sup>3</sup> *Implementation Guide for the Washington State Petroleum Products Contingency Plan*, OTED Energy Division.

<sup>4</sup> *Study of Western Power Market Prices Summer 2000, Final Report*, October 2000. Northwest Power Planning Council document 2000-18.

<sup>5</sup> *Proposed Pacific Northwest Winter 2000-01 Energy Emergency Plan*; NWPP, Pacific Northwest Utilities Conference Committee, Northwest Power Planning Council.

<sup>6</sup> December 8, 2000, *Northwest governors urge conservation as cold spell looms*. <http://www.governor.wa.gov/press/press.htm>

<sup>7</sup> December 11, 2000, *Locke renews call for energy conservation as cold snap continues*. <http://www.governor.wa.gov/press/press.htm>

<sup>8</sup> December 12, 2000. *Warning of stage two energy alert lifted*. <http://www.governor.wa.gov/press/press.htm>

<sup>9</sup> "A Northwest Power Pool survey discovered that utility and public conservation actions reduced total loads [in the Northwest] by 835 MWh from 5 p.m. to 6 p.m. on December 12....." *Clearing Up*, December 25, 2000.

<sup>10</sup> Governor's Press Release: *Locke declares energy alert to protect fishing and agriculture industries*, August 10, 2000. <http://www.energy.cted.wa.gov/>

Governor Locke's Remarks on declaring an Energy Alert at Bellingham Cold Storage, August 10, 2000. <http://www.energy.cted.wa.gov/>

Declaration of Energy Alert, <http://www.governor.wa.gov/eo/energy.htm>